



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/554,296	10/26/2005	Jean-Pierre Musy	MUSY3001/JEK	4472
23364	7590	05/01/2007		
BACON & THOMAS, PLLC 625 SLATERS LANE FOURTH FLOOR ALEXANDRIA, VA 22314			EXAMINER KAYES, SEAN PHILLIP	
			ART UNIT 2833	PAPER NUMBER
			MAIL DATE 05/01/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/554,296	MUSY ET AL.	
	Examiner	Art Unit	
	Sean Kayes	2833	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/26/2005, initial filling.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 October 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/26/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2, 3, and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. With respect to claim 2 the term "slightly less" is a relative term which renders the claim indefinite. The term "slightly less" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

4. The term "substantially equal" in claim 3 is a relative term which renders the claim indefinite. The term "substantially equal" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

5. With respect to claim 17 the language "infinite" stiffness renders the claim indefinite because this limitation is not possible and subsequently it is unclear what applicant is intending to claim.

Drawings

6. Figures 2-4 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claim 13 is rejected under 35 U.S.C. 102(b) as being anticipated by Suard (US 3528237.)

9. With respect to claim 13 Suard discloses a method of designing a regulating device having a balance and a plane hairspring for a time piece movement, in which method a stiffened portion is provided in the outer turn of the plane hairspring so as to cause the deformations of the turns to be substantially concentric, the method comprising

- providing a spacing (figure 2a) between a terminal portion of the outer turn and the last-but-one turn of the hairspring, said spacing being large enough for said last-but-one turn to remain free radially during expansions of the hairspring up to amplitudes corresponding substantially to the maximum angle of rotation of a balance in said movement.

10. Claims 1, 4-10, and 13-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Michel (Switzerland 327796.)

11. With respect to claim 1 Michel discloses a regulating device comprising a balance and a plane hairspring for a time piece movement, the plane hairspring including in its outer turn

- a stiffened portion (section between A and B figure 1) arranged to cause the deformations of the turns to be substantially concentric, wherein
- the spacing (figure 1) between a terminal portion of the outer turn and the last-but-one turn of the hairspring is large enough for said last-but-one turn to remain free radially during expansions of the hairspring up to amplitudes corresponding substantially to the maximum angle of rotation of the balance in said movement.

12. With respect to claim 4 Michel discloses the regulating device according to claim 1, wherein the spacing between the terminal portion of the outer turn (see figure 1) and the last-but-one turn of the hairspring is large enough for said last-but-one turn to

remain free radially during expansions of the hairspring up to amplitudes corresponding substantially to the knocking angle of the balance in said movement.

13. With respect to claim 5 Michel discloses the regulating device according to claim 1, wherein the stiffened portion (the region designated between A and B figure 1, cross sections are shown in figures 3-11) is a portion of strip of thickness in the plane of the hairspring greater than the thickness of the remainder of the strip forming the hairspring.

14. With respect to claim 6 Michel discloses the regulating device according to claim 5, wherein the thickness in the plane of the hairspring of the stiffened portion varies over the entire length of the stiffened portion as a convex and continuous function (figures 6 and 7) and presents a minimum substantially equal to the thickness of the remainder of the strip (figure 2) at the two ends of the stiffened portion and a maximum that is greater than the thickness of the remainder of the strip between said two ends.

15. With respect to claim 7 Michel discloses the regulating device according to claim 5, wherein the thickness in the plane of the hairspring of the stiffened portion is substantially constant (figure 1) over the entire length of said stiffened portion.

16. With respect to claim 8 Michel discloses the regulating device according to claim 5, wherein the thickness in the plane of the hairspring of the stiffened portion is substantially constant over the entire length of said stiffened portion except in terminal

Art Unit: 2833

portions where, respectively, the thickness decreases continuously towards the ends of said stiffened portion (top and bottom of stiffened portion shown in figure 9 show wherein the terminal ends are tapered to have less thickness than in the center of said stiffened portion.)

17. With respect to claim 9 Michel discloses the regulating device according to claim 5, wherein the extra thickness defined by the stiffened portion relative to the remainder of the strip is situated exclusively on the outer side of the outer turn. (The embodiments of figures 6 and 7 show the thickness protruding in an outward direction.)

18. With respect to claim 10 Michel discloses the regulating device according to claim 5, wherein the height of the hairspring is substantially constant over the entire length of said hairspring (lines 1-3 page 1, states that the present invention is a flat coil.)

19. With respect to claim 13 Michel discloses a method of designing a regulating device having a balance and a plane hairspring for a time piece movement, in which method a stiffened portion is provided in the outer turn of the plane hairspring so as to cause the deformations of the turns to be substantially concentric, the method comprising

- providing a spacing (figure 1) between a terminal portion of the outer turn and the last-but-one turn of the hairspring, said spacing being large enough for said last-but-one turn to remain free radially during expansions of the hairspring up to

amplitudes corresponding substantially to the maximum angle of rotation of a balance in said movement.

20. With respect to claim 14 Michel discloses the method according to claim 13, wherein in order to design the plane hairspring with the stiffened portion, the following steps are performed:

- defining a plane hairspring of constant strip thickness (lines 1-3 page 1);
- determining the unbalance (lines 7-15 page 1) of said plane hairspring;
- determining a portion of the outer turn (.beta. figure 1) of said plane hairspring having the same unbalance as the plane hairspring; and
- stiffening said outer turn portion (figures 3-11).

21. With respect to claim 15 Michel discloses the method according to claim 14, wherein the step of stiffening the outer turn portion comprises increasing its thickness in the plane of the hairspring (figures 3-11.)

22. With respect to claim 16 Michel discloses the method according to claim 13, wherein in order to design the plane hairspring with the stiffened portion, the following steps are performed:

- defining a plane hairspring of constant strip section (figure 2);
- determining the unbalance (lines 7-15 page 1) of said plane hairspring;

Art Unit: 2833

- determining a portion of the outer turn (β , figure 1) of said plane hairspring having the same unbalance as the plane hairspring; and
- varying the thickness (figures 3-11), in the plane of the hairspring, of the strip forming the hairspring between an angle δ_1 and an angle δ_2 such that $\delta_1 < \beta_1$ and $\delta_2 > \beta_2$, where $\beta_2 - \beta_1$ is the angular extent of said portion of the outer turn,
- the thickness being caused to vary in accordance with a predetermined function f (figures 3-11) presenting a minimum substantially equal to the thickness of the remainder of the strip at the angles δ_1 and δ_2 ,
- the function f and the angles δ_1 and δ_2 being selected so that the deformation of the turn portion delimited by the angles δ_1 and δ_2 is substantially the same as the deformation which would occur if the thickness of the strip between the angles δ_1 and β_1 and between the angles β_2 and δ_2 were the same as that of the remainder of the hairspring and if, between the angles β_1 and β_2 , the stiffness of the outer turn were equal to a predetermined value, greater than that of the remainder of the strip (figure 1 and figures 3-11.)

23. With respect to claim 18 Michel discloses the method according to claim 16, wherein the predetermined function f is convex and continuous (figures 6 and 7.)

Art Unit: 2833

24. With respect to claim 19 Michel discloses the method according to claim 13, wherein, in order to determine a spacing that is sufficient between the terminal portion of the outer turn and the last-but-one turn, the following steps are implemented:

- defining a first point (between A and G figure 1) on the radial axis passing through the outer end of an initial plane hairspring having a stiffened portion, the first point being situated beyond the last-but-one turn of said initial plane hairspring when said last-but-one turn is expanded by an amplitude corresponding to the maximum angle of rotation of the balance;
- defining a second point (B figure 1) on the outer turn;
- interconnecting the first and second points by a circular arc that is tangential to the outer turn at the second point (figure 1);
- defining a third point (A figure 1) on the circular arc between the first and second points, the third point being such that the length of the segment of the circular arc delimited by the second and third points is equal to the length of the initial turn segment delimited by the second point and the initial outer end of the hairspring; and
- giving a thickness (figures 3-11) in the plane of the hairspring to the circular arc between the second and third points that is identical to the thickness of the initial turn segment, the resulting turn segment between the second and third points constituting a corrected terminal portion of the outer turn.

25. With respect to claim 20 Michel discloses the method according to claim 19, wherein the second point (B figure 1) is situated at the end of the stiffened portion (B-A figure 1 and figures 3-11) that is further from the outer end of the hairspring.

26. With respect to claim 21 Michel discloses the method according to claim 13, wherein, in order to determine a spacing that is sufficient between the terminal portion of the outer turn and the last-but-one turn, the following steps are implemented:

- defining a point (A figure 1) on the outer turn in the stiffened portion;
- offsetting the terminal portion (figure 1) of the hairspring extending from said point radially outwards by giving the inner side of said terminal portion a circularly-arcuate shape the center of which is the geometrical center of the hairspring and the outer side of said terminal portion a shape that gives said terminal portion a thickness in the plane of the hairspring that is identical to the thickness of the corresponding initial terminal portion of the outer turn (figure 2);
and
- connecting the terminal portion with the remainder of the stiffened portion by a connection portion that forms a double bend (double bend between A and G figure 1.)

Claim Rejections - 35 USC § 103

27. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2833

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

28. Claims 2, 11-12, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Michel (Switzerland 327796.)

29. With respect to claim 11 Michel discloses a device according to claim 1.

Michel does not teach a time piece movement.

Michel does teach using the regulating device of claim 1 in a timepiece, lines 1-3 page

1.) Timepiece movements are well known in the art.

At the time of the invention it would have been obvious to one skilled in the art to use

Michel's regulating device in a timepiece movement as taught by Michel. The

suggestion or motivation for doing so would be to provide an improved regulating device for a timepiece as taught by Michel.

30. With respect to claim 12 Michel discloses a relating device according to claim 11.

Michel does not teach a time piece, such as a watch, or a watch movement,

Michel does teach using the regulating device of claim 1 in a timepiece, lines 1-3 page

1.) Timepiece movements are well known in the art.

At the time of the invention it would have been obvious to one skilled in the art to use

Michel's regulating device in a timepiece movement as taught by Michel. The

suggestion or motivation for doing so would be to provide an improved regulating device for a timepiece as taught by Michel.

Art Unit: 2833

31. With respect to claim 2 Michel discloses the regulating device according to claim 1.

Michel does not teach wherein the maximum angle of rotation of the balance in said movement is slightly less than the knocking angle.

Applicant defines the term "maximum angle of rotation" to mean "the maximum angle that the balance wheel 1 is liable to reach during normal conditions of operation of the movement. Knocking is not considered to be condition of normal operation.

At the time of the invention it would have been obvious to one skilled in the art to make Michel's device such that the maximum angle of rotation is less than the knocking angle. The suggestion or motivation for doing so would be to constrain the movement of the hairspring to the conditions of normal operation.

32. With respect to claim 22 Michel discloses a method of making a regulating device having a balance and a plane hairspring for a time piece movement, comprising designing the regulating device in accordance with the method as defined in claim 13.

Michel does not explicitly state the step of fabricating said regulating device.

Michel does teach using the device in a timepiece, this would require fabricating said device first.

At the time of the invention it would have been obvious to one skilled in the art to fabricate the device taught by Michel. The suggestion or motivation for doing so would be to provide the device for use in a timepiece as taught by Michel.

Conclusion

33. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

34. Tuetey (US 3826076) teaches conditions which may cause knocking.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sean Kayes whose telephone number is (571) 272-8931. The examiner can normally be reached on 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bradley Paula can be reached on (571) 272-2800. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SK
4/26/2007



Vit Miska
Primary Examiner